



FINAL REPORT

**A REVIEW OF ONTARIO'S WATER QUANTITY
MANAGEMENT FRAMEWORK:
WATER QUANTITY STUDY AREA REPORT**

Appendix A – Part 2

Prepared for:

Government of Ontario
Ministry of the Environment, Conservation and Parks
Standards Development Branch
7th Floor, 40 St Clair Avenue West
Toronto, ON M4V 1M2

Prepared by:

BluMetric Environmental Inc.
171 Victoria Street North
Kitchener, ON N2H 5C5

Project Number: 180107-06
Submission Date: 28 March 2019

This report has been separated in 5 sections for internet posting.

REPORT BODY AND APPENDIX C

APPENDIX A - PART 1

- FIGURES for Guelph – Centre Wellington, Orangeville and Norfolk Sand Plain Water Quantity Study Areas

APPENDIX A - PART 2

- FIGURES for Innisfil And Whitemans Creek Water Quantity Study Areas

APPENDIX A - PART 3

- FIGURES for Quinte Water Quantity Study Area

APPENDIX A - PART 4

- FIGURES for Chapleau Water Quantity Study Area

Appendix B has been removed from the posted report in accordance with privacy requirements.

(Inserted by the Ministry of the Environment, Conservation and Parks, June 2020)



LEGEND

- Preliminary Water Quantity Study Area (WQSA)
- Conservation Authority
- Innisfil Creek Subwatershed
- Innisfil Creek Watershed
- Municipality
- Major Watercourse
- Watercourse

1				
REV	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
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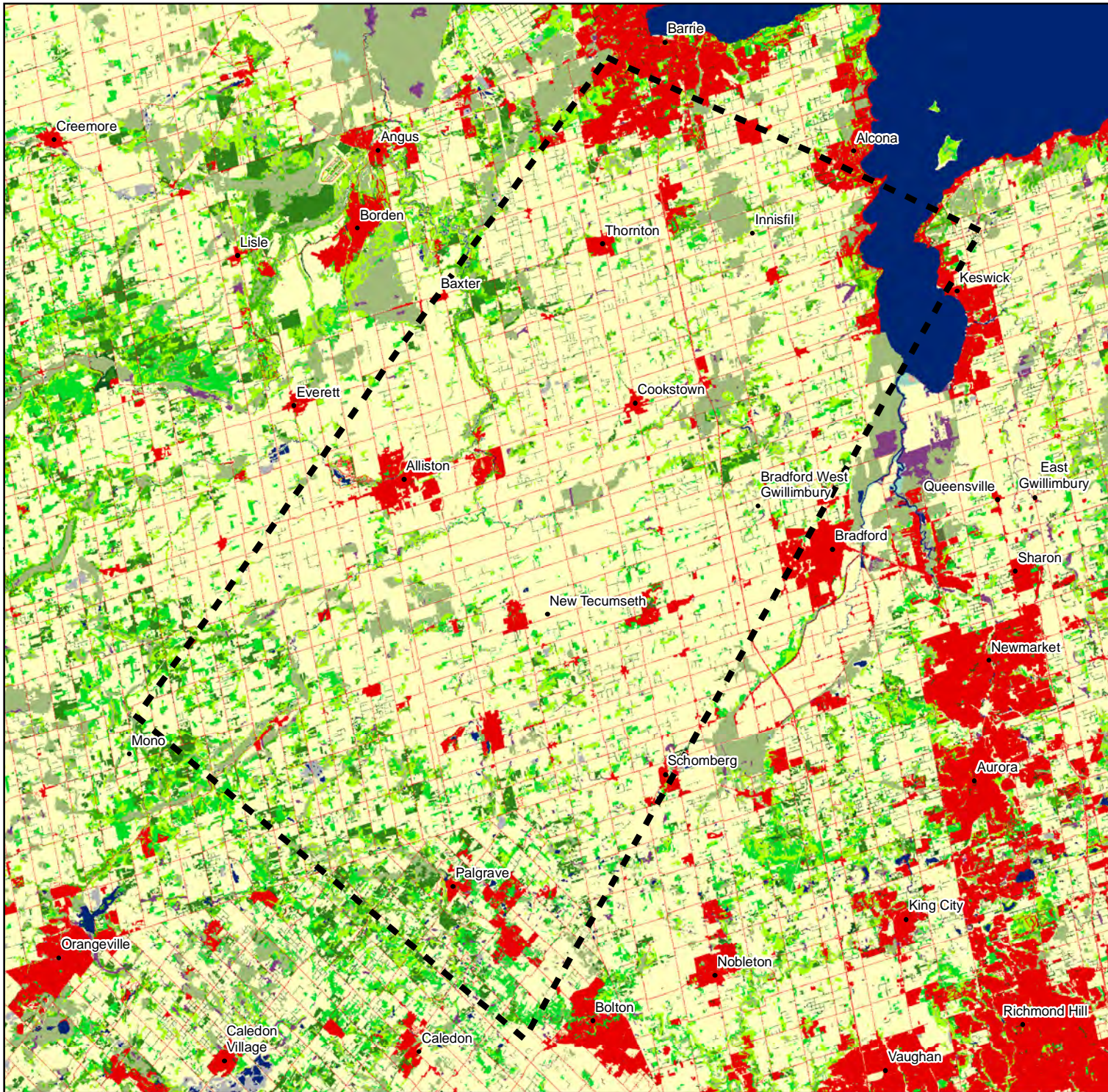
PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Innisfil Water Quantity Study Area Boundary

171 Victoria St. N.,
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 TEL: (519) 742-6685
 FAX: (519) 742-9810
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FIG NO. 7-1	REV 0



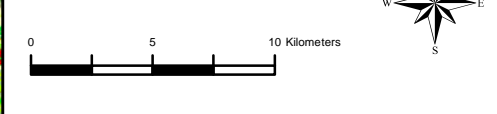


LEGEND

- Preliminary Water Quality Study Area (WQSA)
- 1 - Clear Open Water
- 5 - Marsh
- 6 - Swamp
- 7 - Fen
- 8 - Bog
- 12 - Treed Upland
- 13 - Deciduous Tree
- 14 - Mixed Tree
- 15 - Coniferous Tree
- 16 - Plantations - Treed Cultivated
- 17 - Hedge Rows
- 22 - Open Tallgrass Prairie
- 24 - Tallgrass Woodland
- 25 - Sand/Gravel/Mine Tailings/Extraction
- 27 - Community/Infrastructure
- 28 - Agriculture and Undifferentiated Rural Land Use

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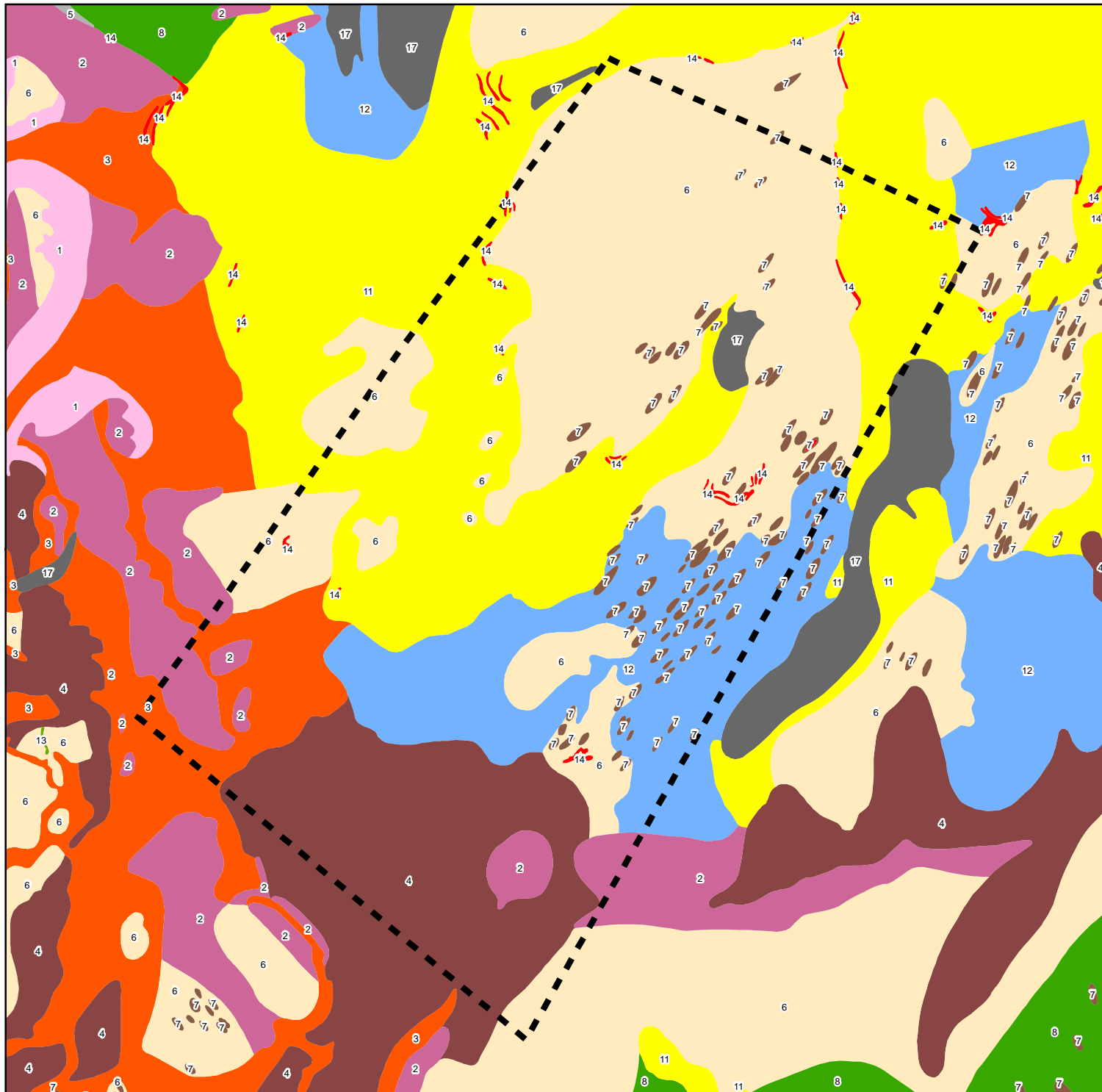
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 Assessment of Water Resources to Support a Review of Ontario's Water Quality Management Framework

TITLE
 Innisfil Land Cover

171 Victoria St. N.,
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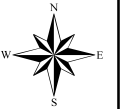
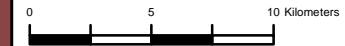
Preliminary Water Quantity Study Area (WQSA)

Southern Ontario Physiography

- 17: Peat And Muck
- 14: Beaches
- 13: Eskers
- 12: Clay Plains
- 11: Sand Plains
- 8: Bevelled Till Plains
- 7: Drumlins
- 6: Till Plains (Drumlinized)
- 5: Till Plains (Undrumlinized)
- 4: Kame Moraines
- 3: Spillways
- 2: Till Moraines
- 1: Escarpments

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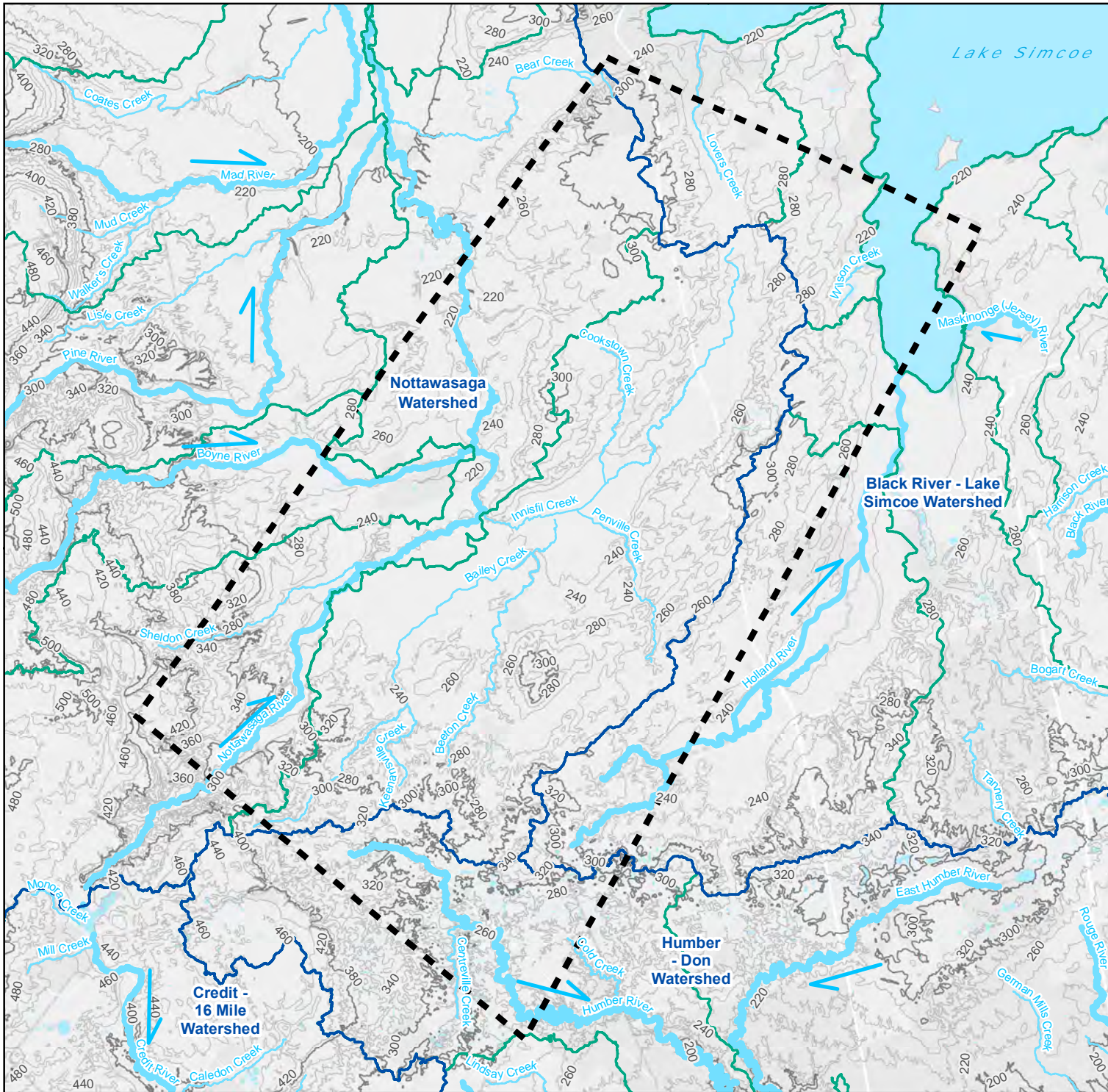
TITLE

Innisfil Regional Physiography



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LEGEND

- Preliminary Water Quantity Study Area (WQSA)
- Tertiary Watershed Boundary
- Quaternary Watershed Boundary
- Waterbody
- Major Water Course and Flow Direction
- Watercourse

Elevation Contours

- 20 m
- 100 m

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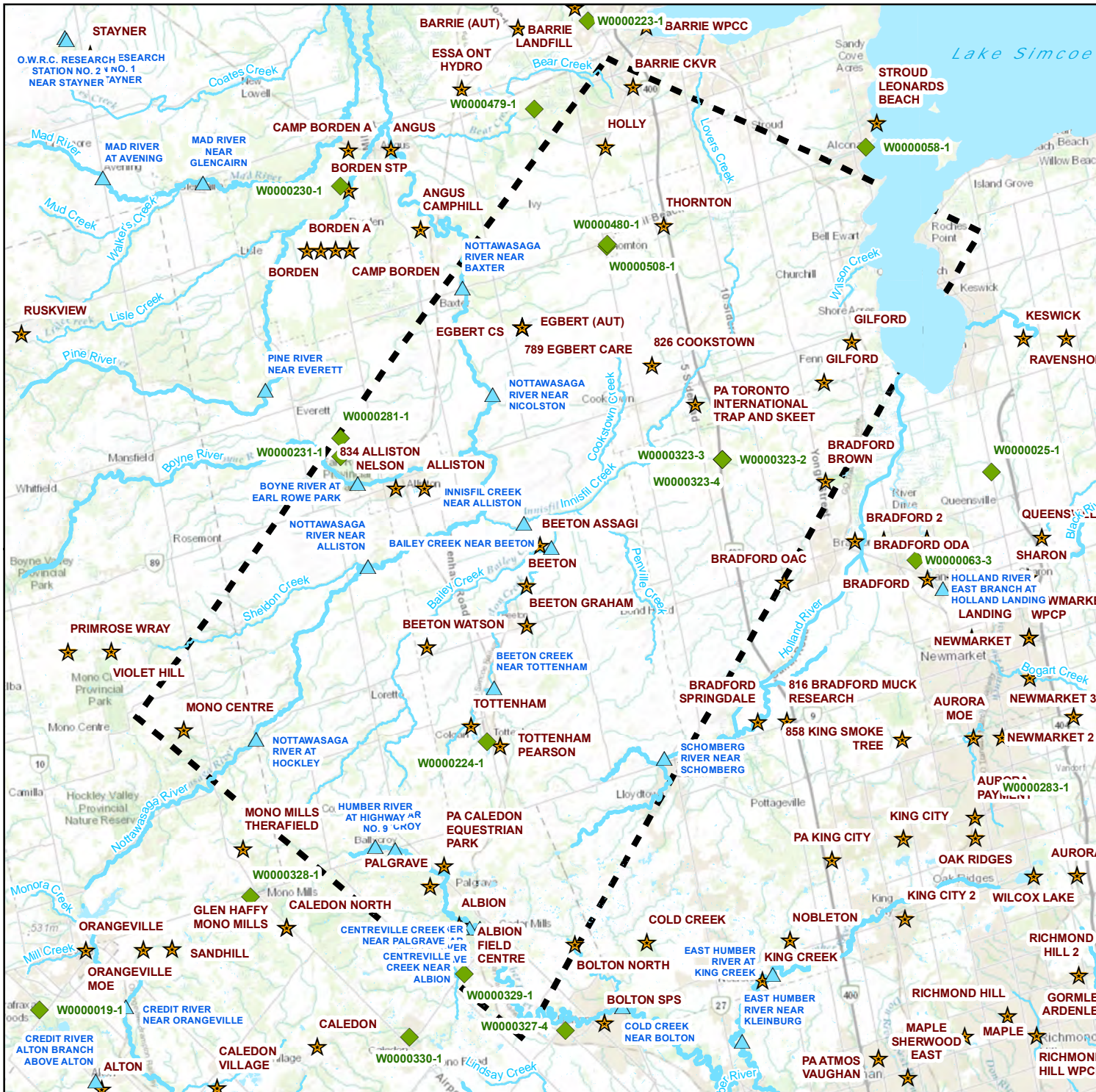
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Innisfil Regional Topography and Hydrology

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LEGEND

- ◆ Provincial Groundwater Monitoring Network Wells
- ▲ HYDAT Stations
- ★ Weather Stations
- Major Watercourse
- Watercourse
- Preliminary Water Quantity Study Area (WQSA)

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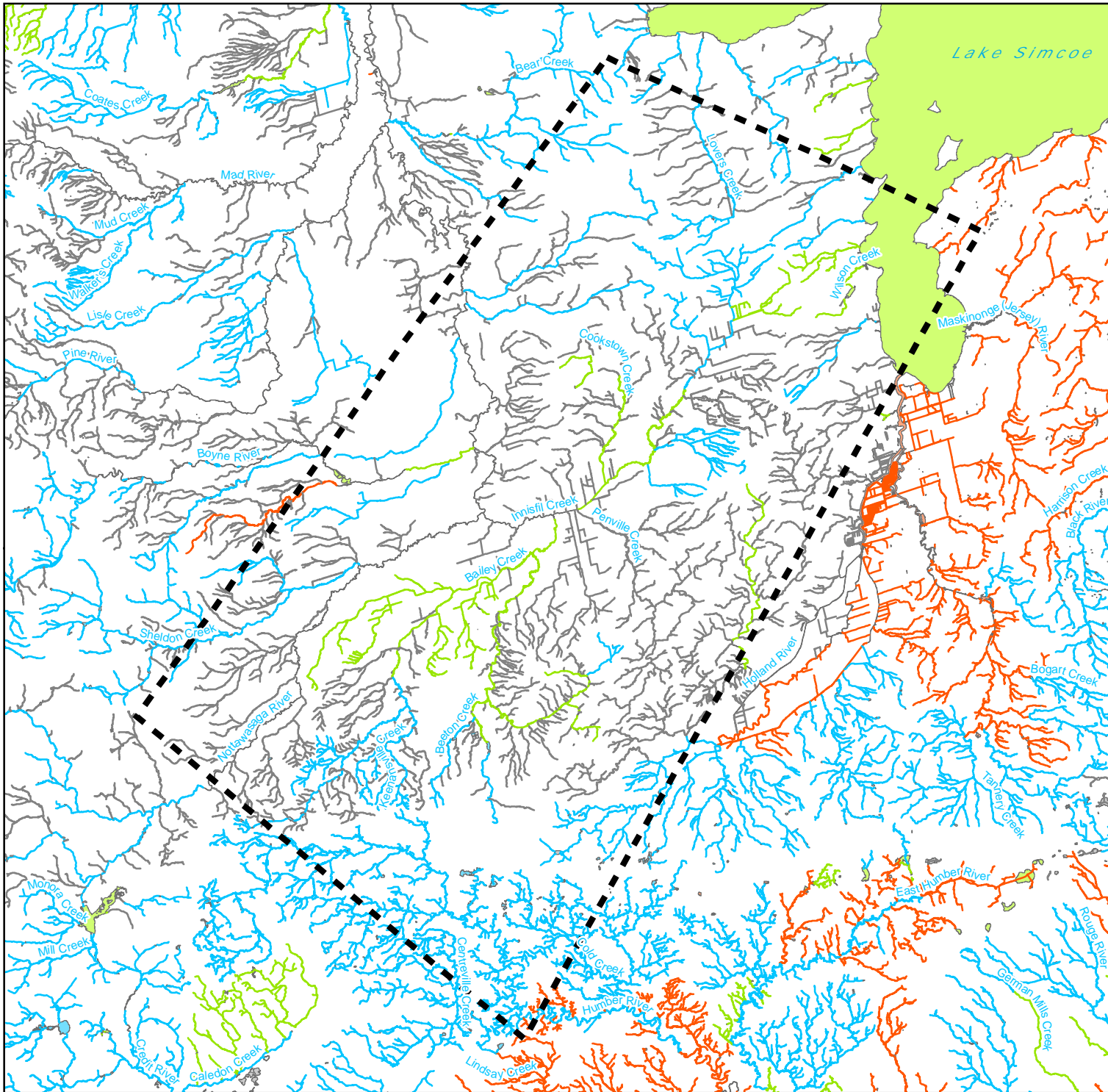
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TITLE
 Innisfil Meteorological Stations

171 Victoria St. N.,
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LEGEND

Watercourse

■ Preliminary Water Quantity Study Area (WQSA)

Thermal Regime

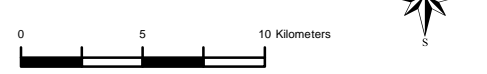
- Unknown
- Cold
- Cool
- Warm

Thermal Regime

- Unknown
- Cold
- Cool
- Warm

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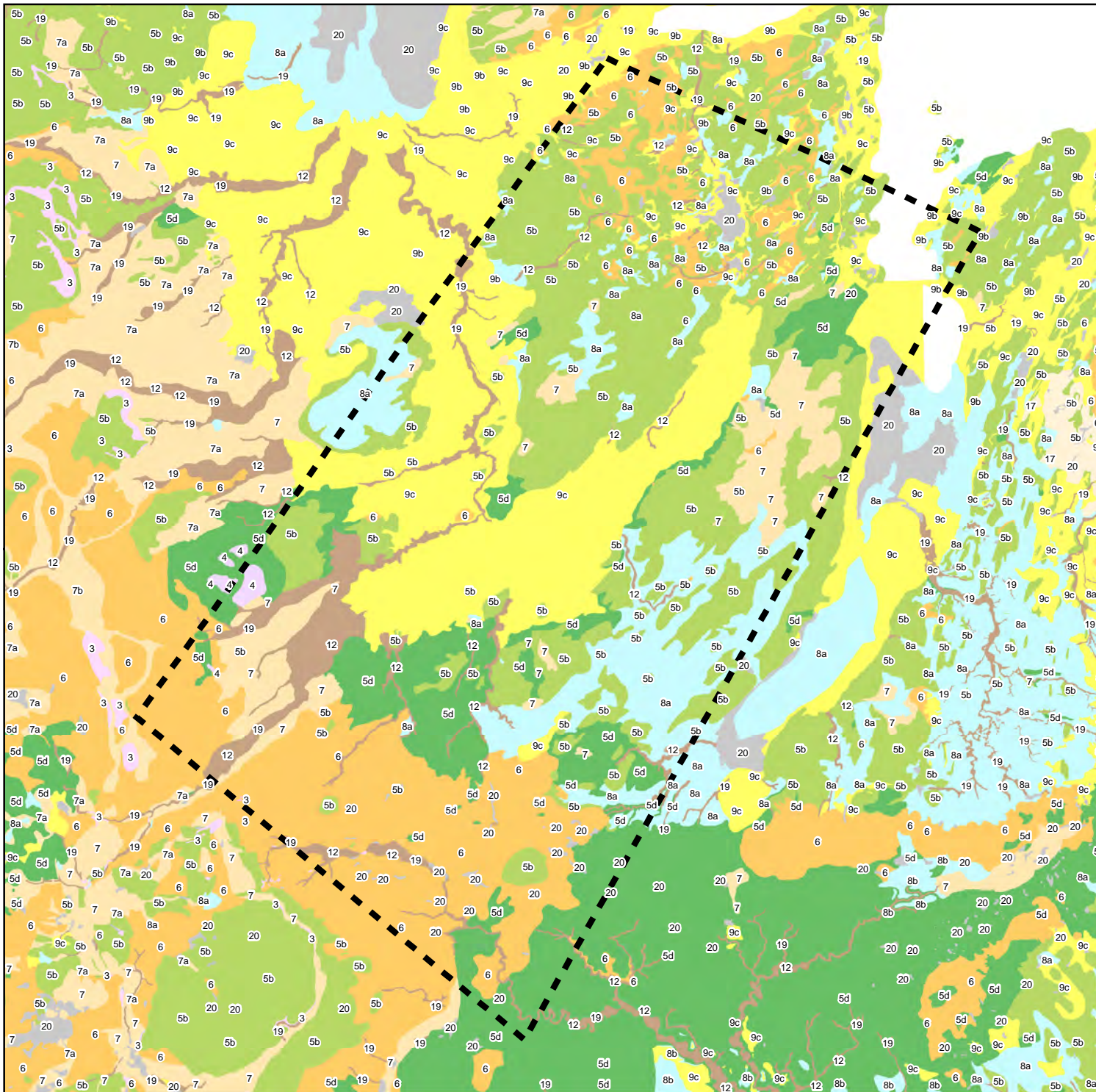
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TITLE
 Innisfil Aquatic Thermal Regions



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LEGEND

Preliminary Water Quantity Study Area (WQSA)

Surficial Geology (MNDM File - MRD128-REV)

- 3: Paleozoic bedrock
- 4: Bedrock-drift complex in Paleozoic terrain
- 5b: Stone-poor, carbonate-derived silty to sandy till
- 5d: Glaciolacustrine-derived silty to clayey till
- 6: Ice-contact stratified deposits
- 7: Glaciofluvial deposits
- 7a: Sandy deposits
- 7b: Gravelly deposits
- 8a: Massive-well laminated
- 8b: Interbedded silt and clay and gritty, pebbly flow till and rainout deposits
- 9b: Littoral-foreshore deposits
- 9c: Foreshore and basinal deposits
- 12: Older alluvial deposits
- 14b: Littoral-foreshore deposits
- 17: Eolian deposits: fine to very fine sand and silt
- 19: Modern alluvial deposits
- 20: Organic deposits

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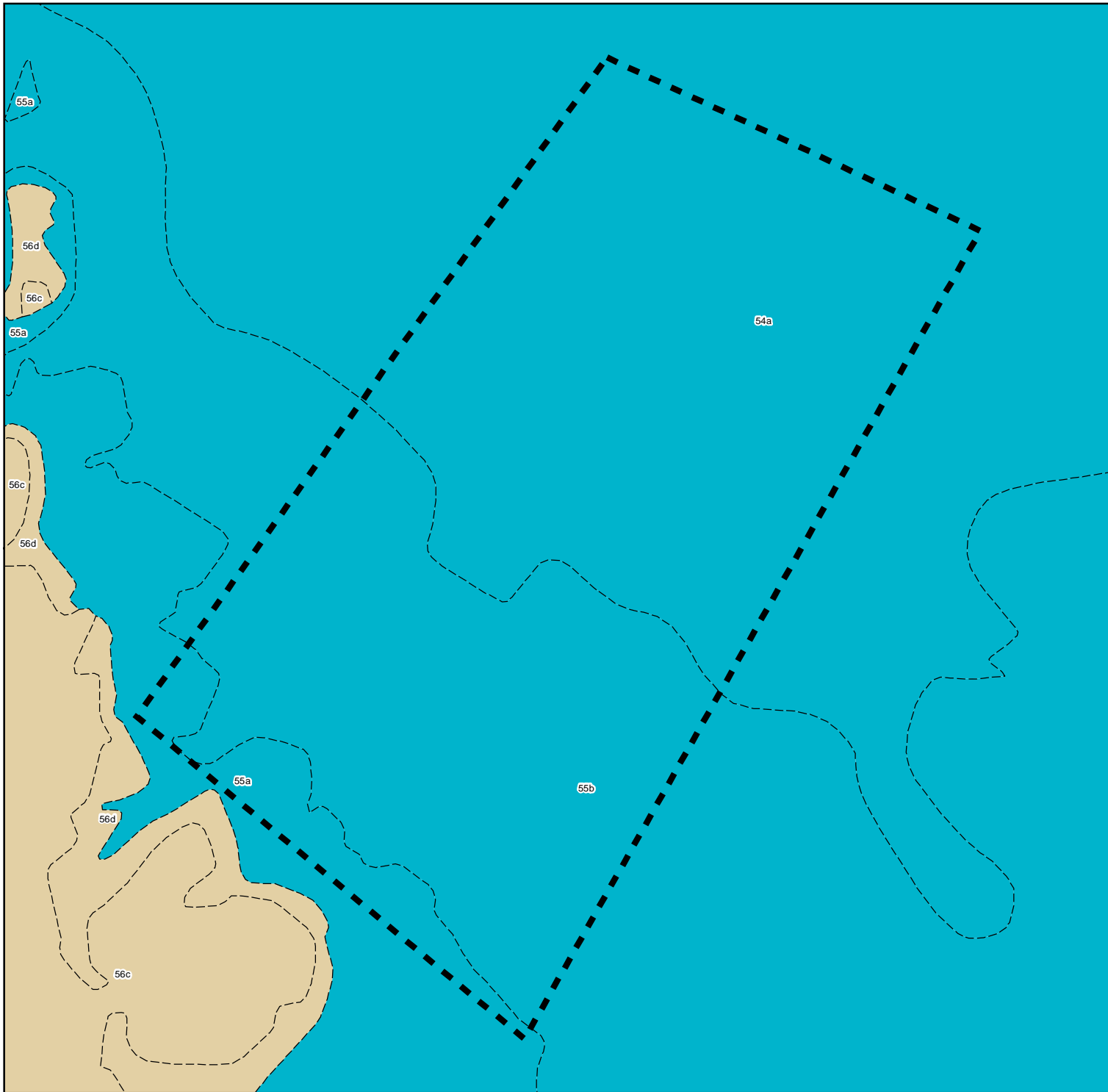
Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE

Innisfil Surficial Geology

171 Victoria St. N.,
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LEGEND

- Preliminary Water Quantity Study Area (WQSA)
- Contact, Sharp, Trend, Interpreted

Middle Ordovician - Limestone, dolostone, shale, arkose, sandstone

- 54a - Ottawa Group; Simcoe Group; Shadow Lake Formation (now considered Upper Ordovician)

Upper Ordovician - shale, limestone, dolostone, siltstone

- 55a - Queenstone Formation
- 55b - Georgian Bay Formation; Blue Mountain Formation; Billings Formation; Collingwood Mb; Eastview Mb

Lower Silurian - sandstone, shale, dolostone, siltstone

- 56c - Amabel Formation
- 56d - Clinton Group; Cataract Group

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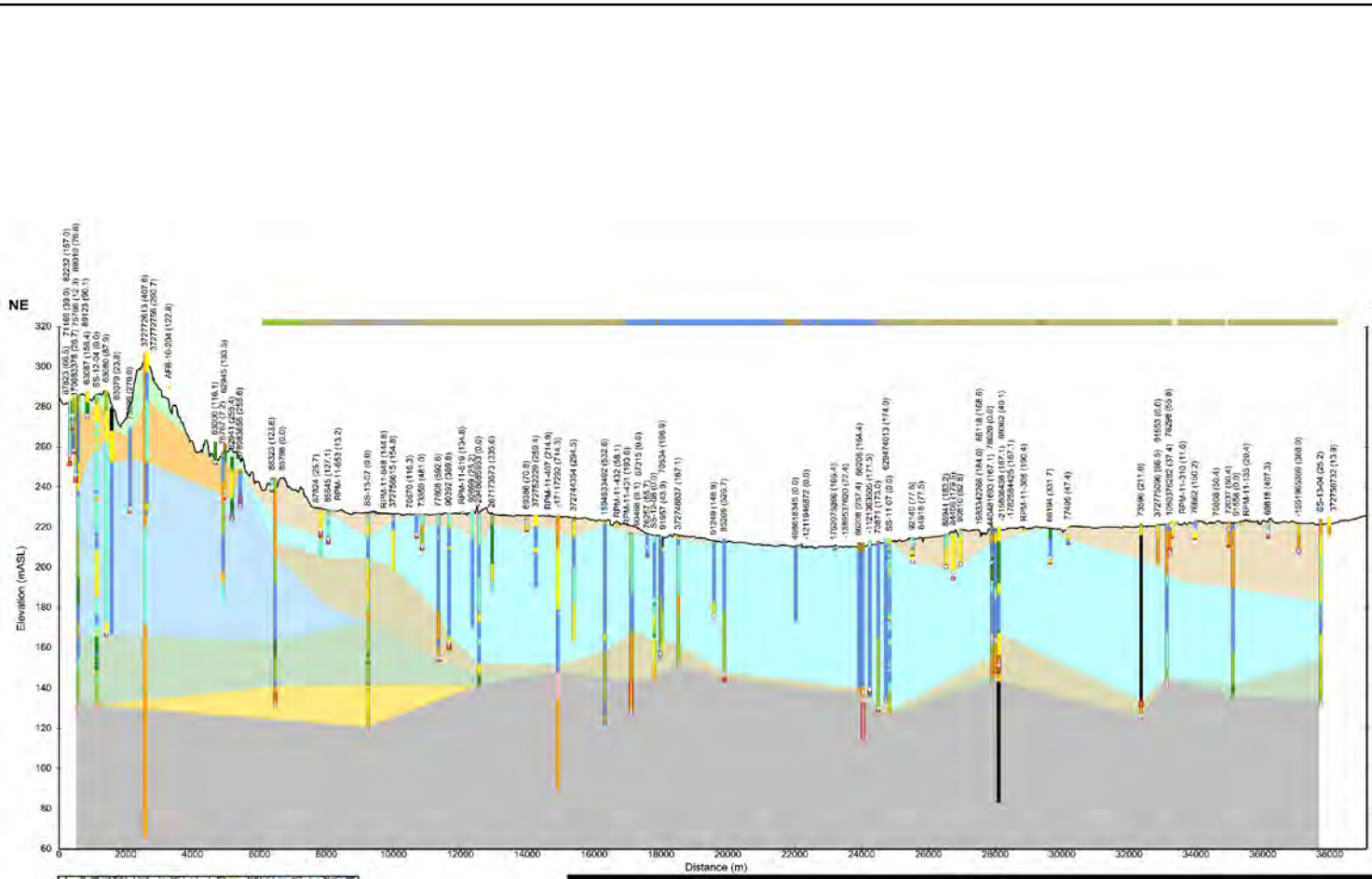
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TITLE
 Innisfil Bedrock Geology

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PROJECT # 180107-06		DATE January 11, 2019	
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LEGEND			
Inset Map	Cross-Section	Surficial Geology (Mulligan and Balc, 2012)	Borehole Lithology
→ Cross-Section	— Ground Surface	Organic deposits	Clay, silty clay
— Road	○ Static Water Level	Modern alluvial deposits	Silt, clayey silt, sandy silt
— Highway	▭ Screened Interval	Eolian deposits	Silty, clayey diamict (llb)
— Railroad	— Well Bore	Fine-grained lacustrine deposits	Sand, silty sand
— Drainage		Newmarket Till	Gravelly sand, gravel
— Open Water			Fill, Topsoil
— Wetland			Organic deposits
— Urban Area			Unknown
			Bedrock
			Unit
			Regressionl Glaciolacustrine Sediment
			Basinal Glaciolacustrine Sediment
			Quaternary Channel Fill
			Newmarket Till
			Coarse-grained Thorncliffe Fm. Equivalents
			Fine-grained Thorncliffe Fm. Equivalents
			Older Tills
			Pre-Quaternary Coarse-grained Channel Fill
			Bedrock

Vertical Exaggeration: 60x

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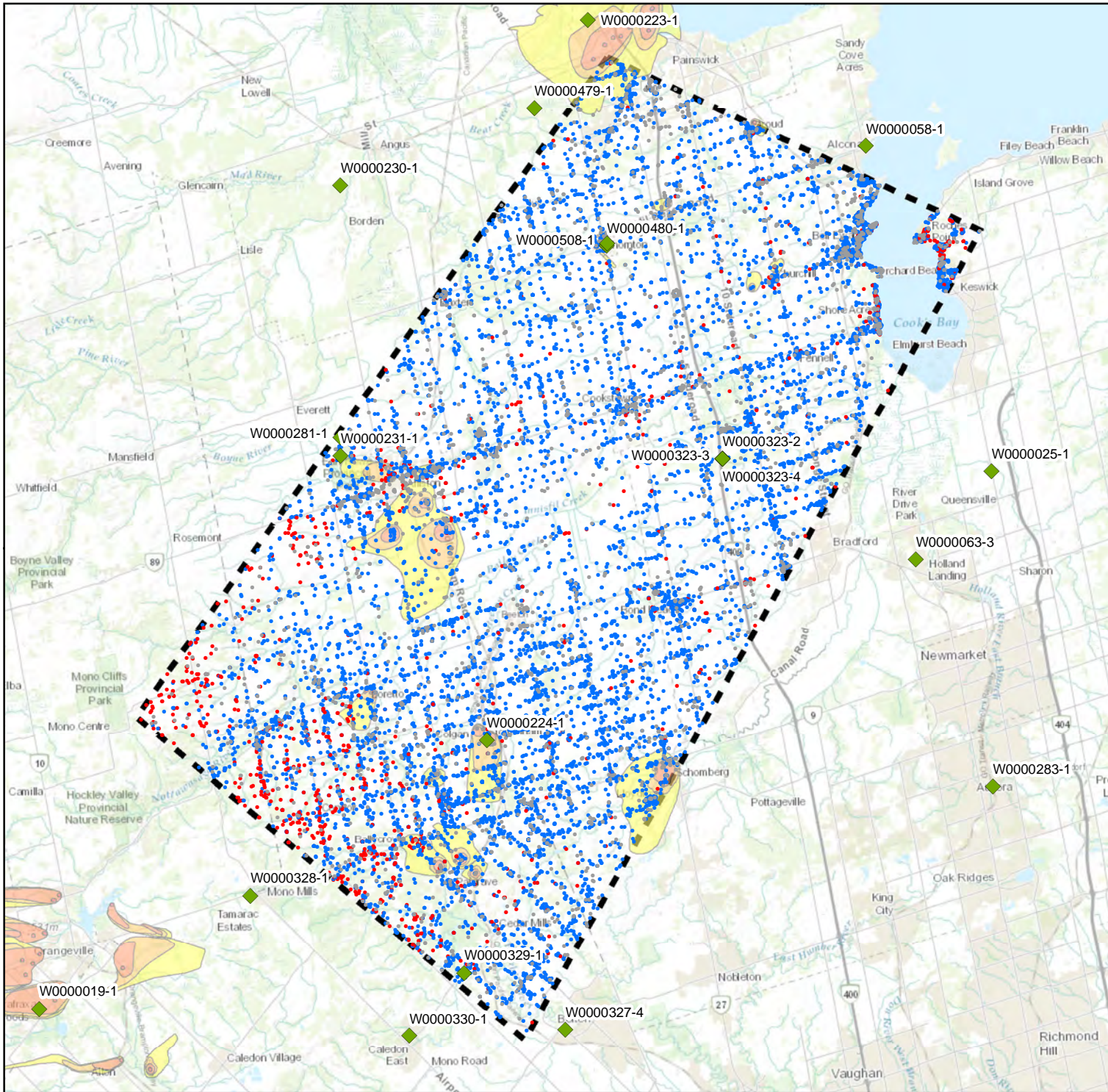
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 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Innisfil Hydrogeological Cross-Section

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LEGEND

- ◆ Provincial Groundwater Monitoring Network Wells
- Bedrock Well
- Overburden Well
- Unknown Well Type

Wellhead Protection Areas

- A
- B
- C
- C1
- D
- F

Preliminary Water Quantity Study Area (WQSA)

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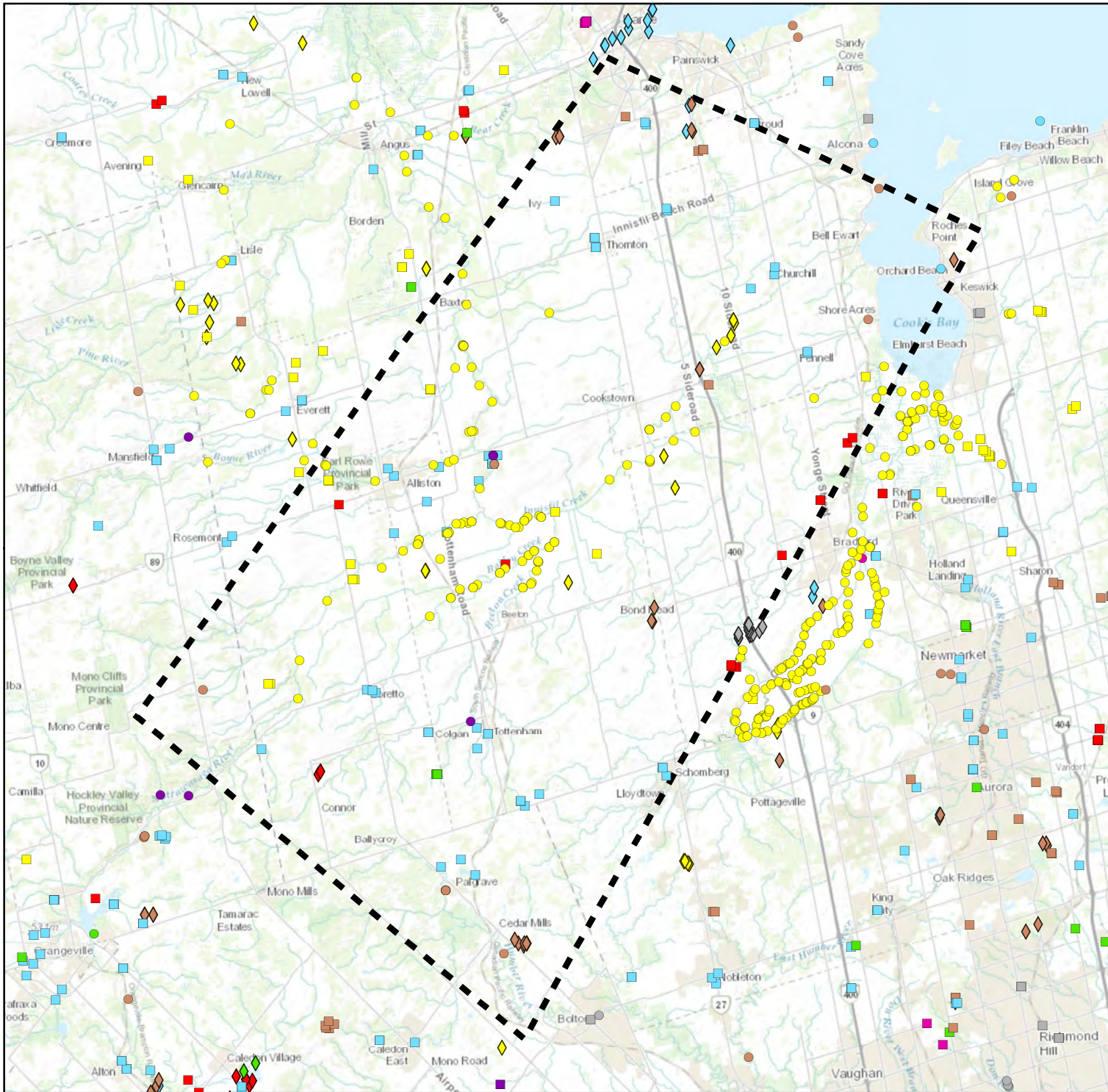
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PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Innisfil Water Well Information System and Provincial Groundwater Monitoring Network Wells

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LEGEND

Preliminary Water Quantity Study Area (WQSA)

Water Taking Permit by Type and Purpose

- Agricultural
- Commercial
- Dewatering
- Industrial
- Institutional
- Miscellaneous
- Recreational
- Remediation
- Water Supply

Surface Water

Groundwater

Both

1				
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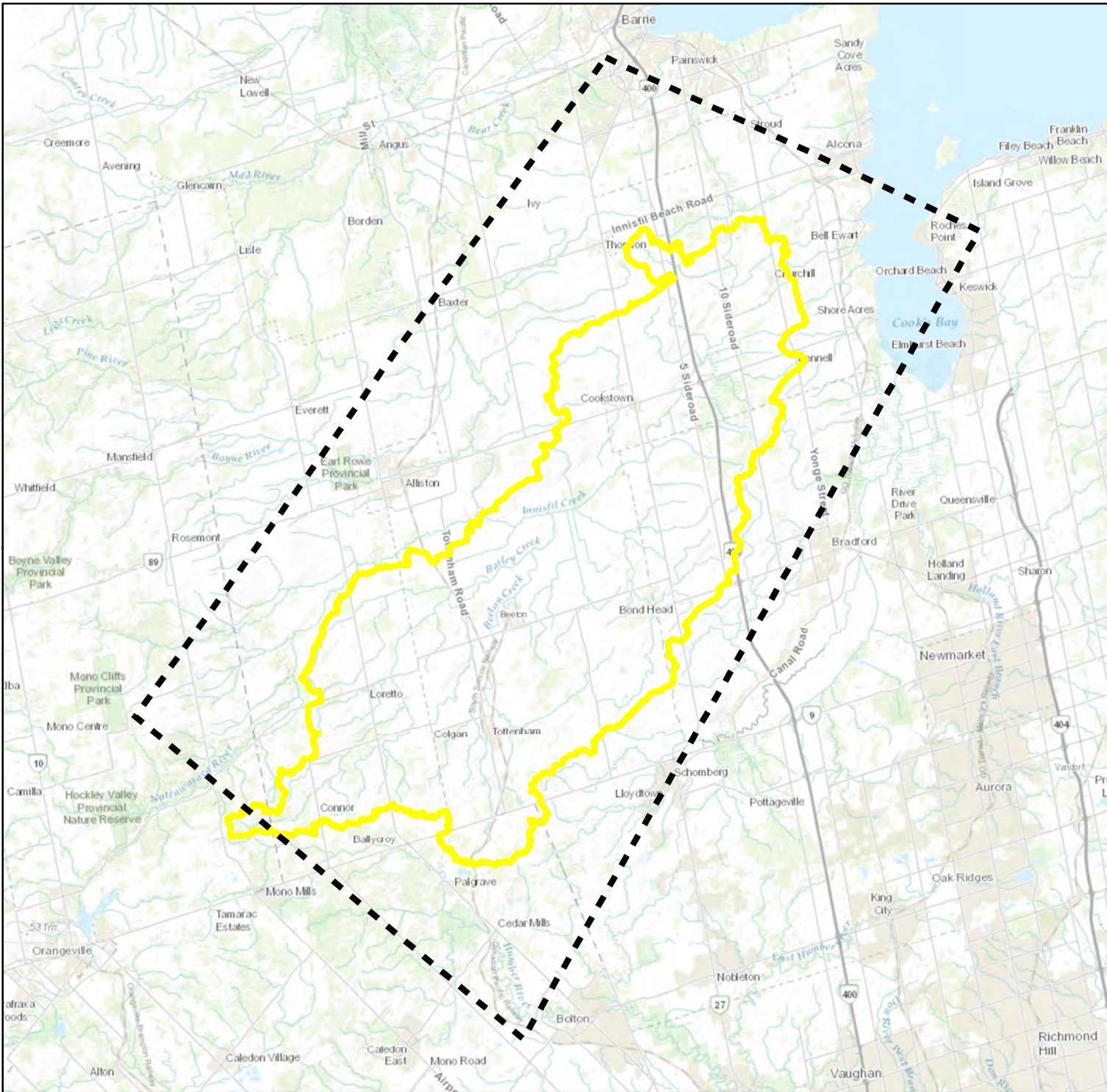
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PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Innisfil Permitted Water Takings

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LEGEND

- Preliminary Water Quantity Study Area (WQSA)
- Revised Innisfil WQSA

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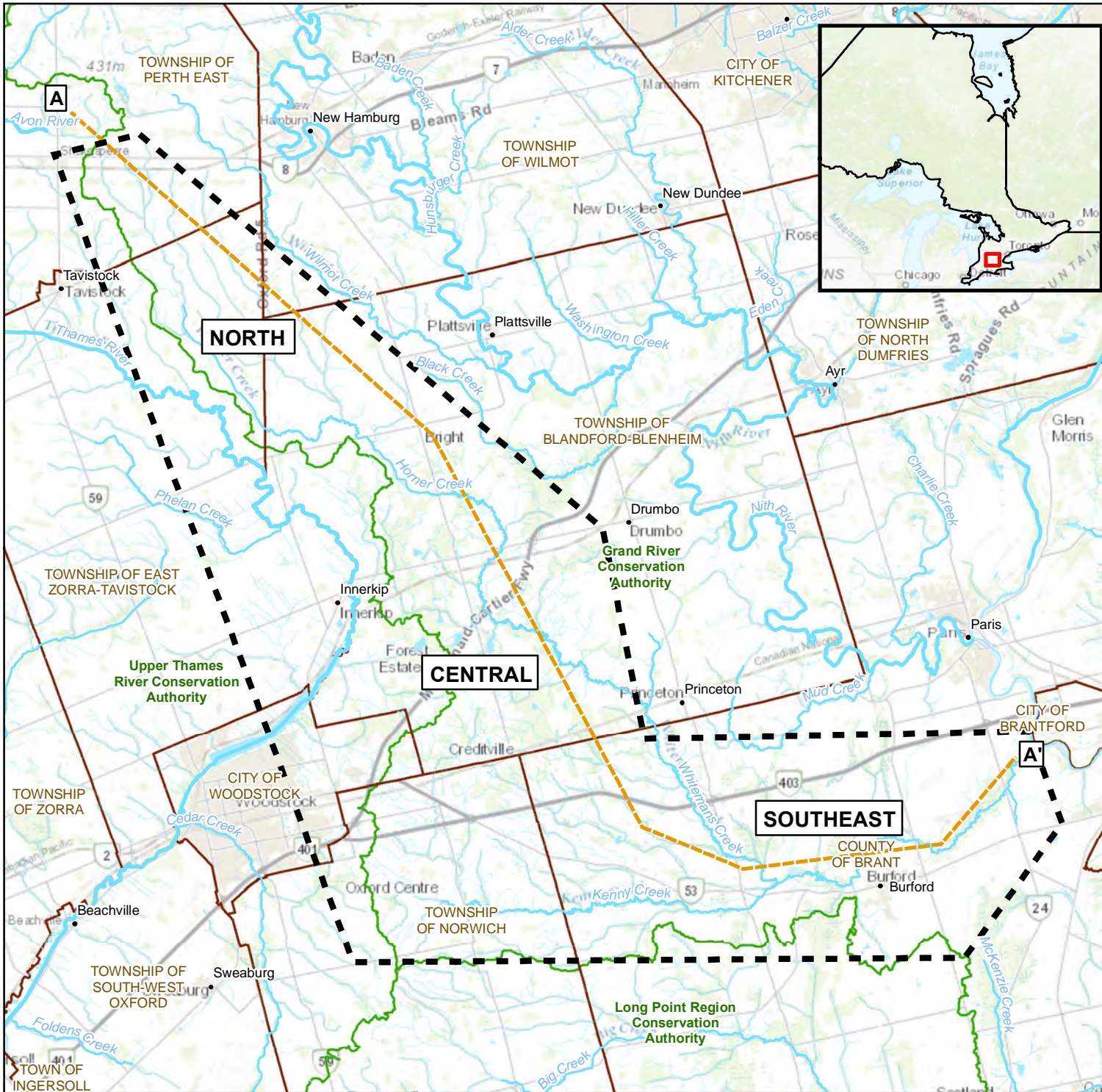
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 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Innisfil Revised Water Quantity Study Area Boundary

171 Victoria St. N.,
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LEGEND

- Preliminary Water Quantity Study Area (WQSA)
- Cross Section Path (Figure 8-10)
- Major Watercourse
- Watercourse
- Municipalities
- Conservation Authority

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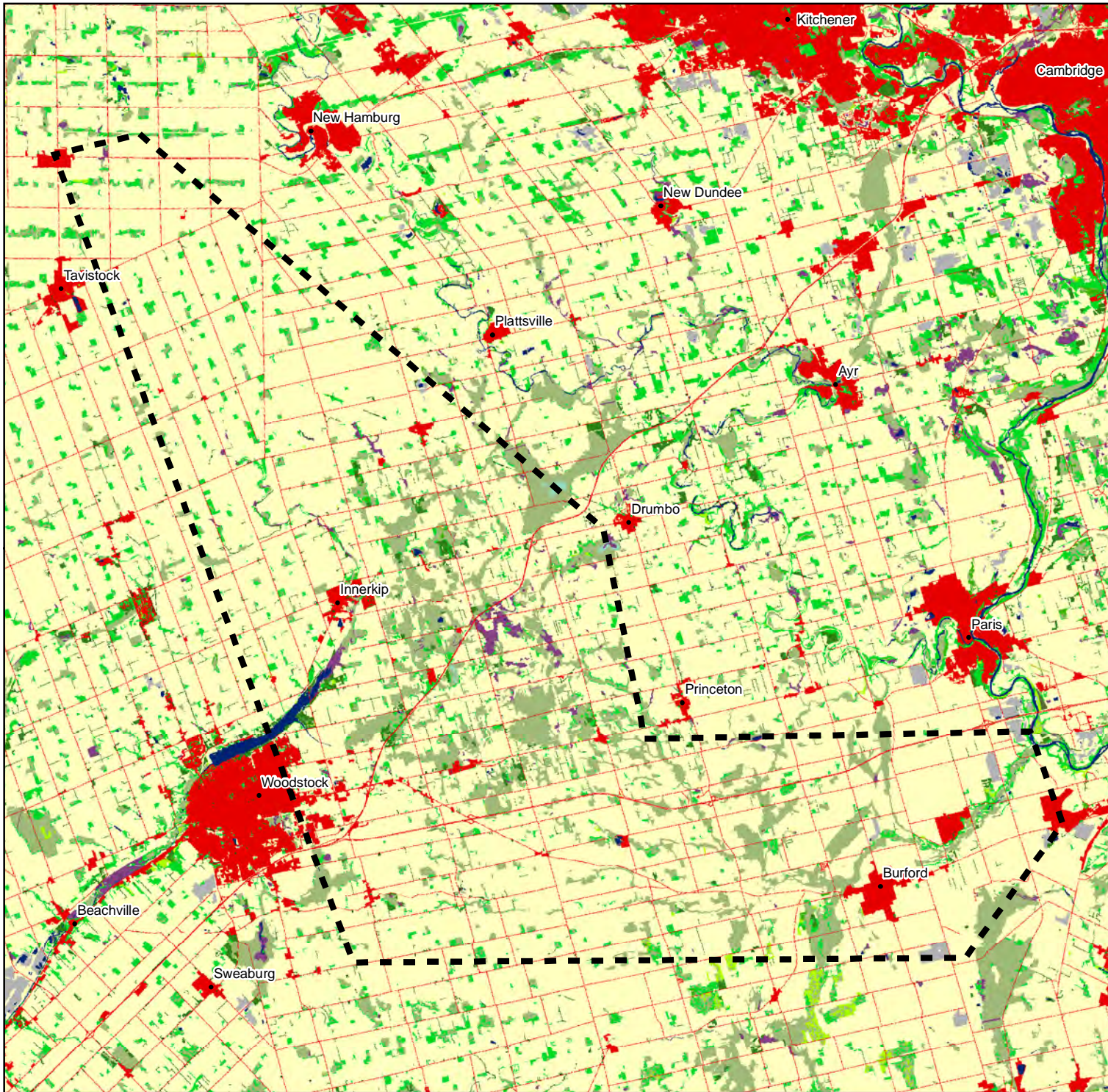
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PROJECT
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TITLE
 Whitemans Creek Water Quantity Study Area Boundary

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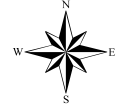


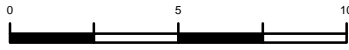
LEGEND

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- 8 - Bog
- 12 - Treed Upland
- 13 - Deciduous Treed
- 14 - Mixed Treed
- 15 - Coniferous Treed
- 16 - Plantations - Treed Cultivated
- 17 - Hedge Rows
- 22 - Open Tallgrass Prairie
- 23 - Tallgrass Savannah
- 24 - Tallgrass Woodland
- 25 - Sand/Gravel/Mine Tailings/Extraction
- 27 - Community/Infrastructure
- 28 - Agriculture and Undifferentiated Rural Land Use

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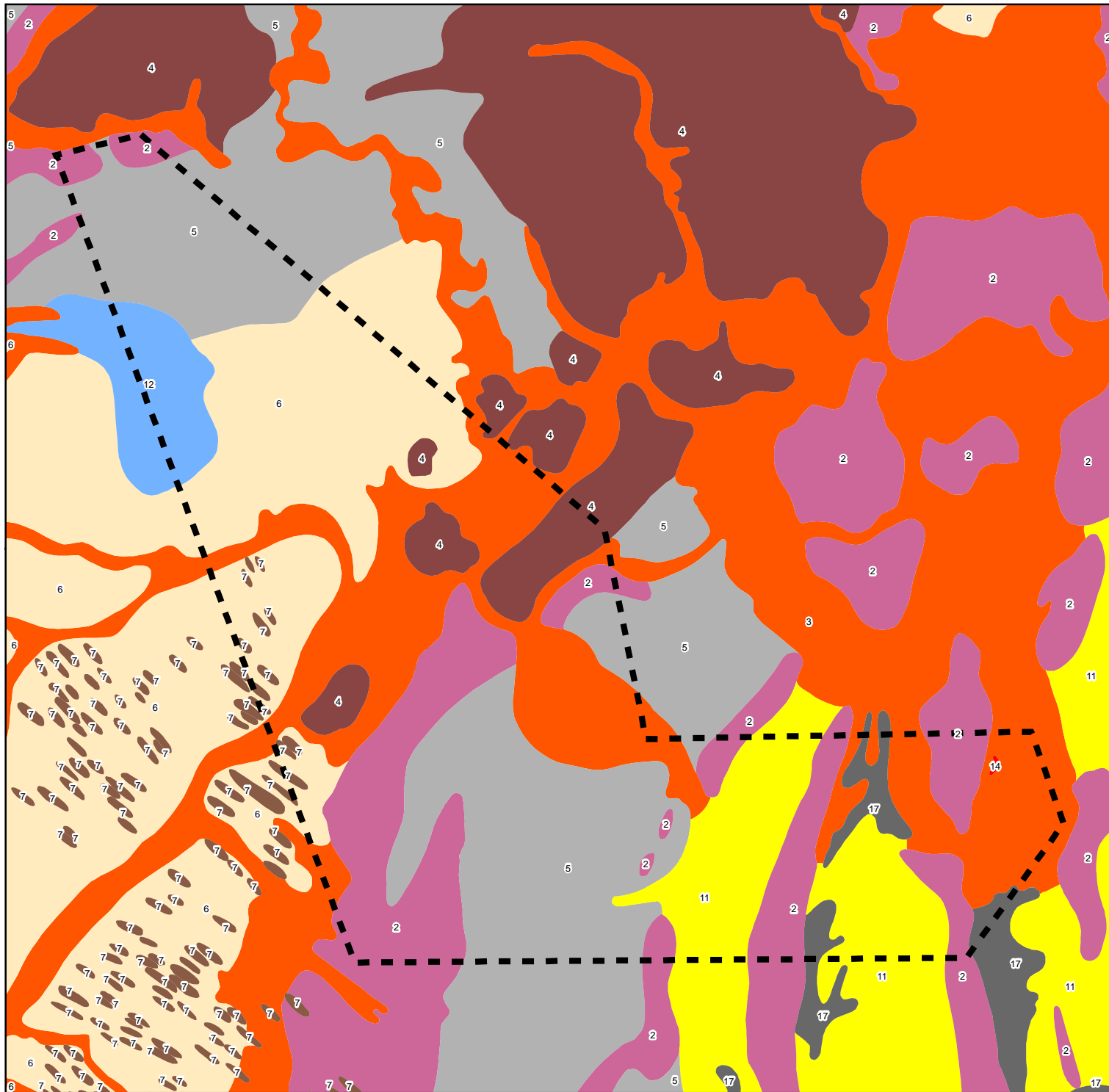
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TITLE
 Whitemans Creek Land Cover



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LEGEND

Preliminary Water Quantity Study Area (WQSA)

Southern Ontario Physiography

- 17: Peat And Muck
- 14: Beaches
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- 11: Sand Plains
- 7: Drumlins
- 6: Till Plains (Drumlinized)
- 5: Till Plains (Undrumlinized)
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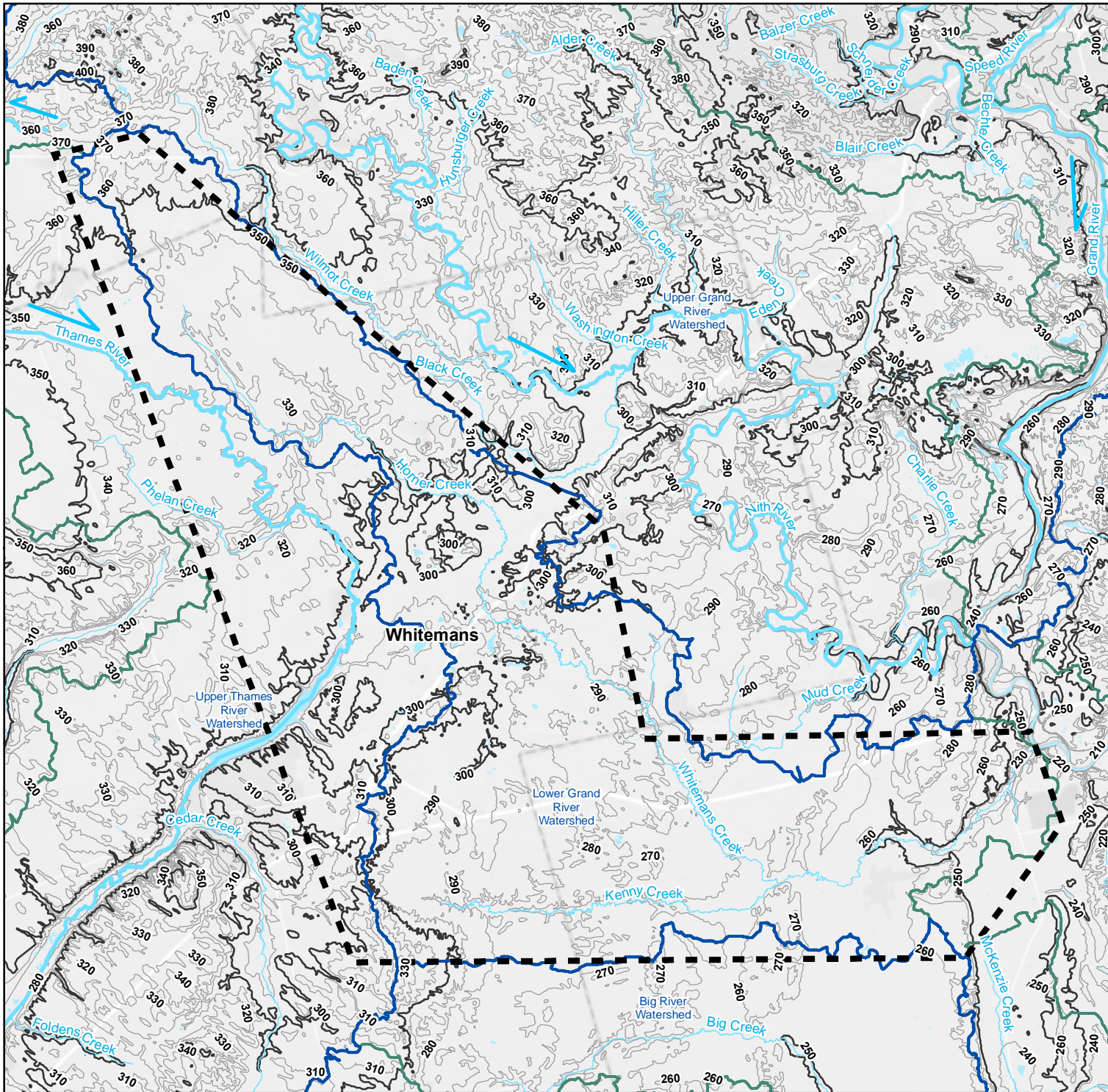
TITLE

Whitemans Creek Regional Physiography



171 Victoria St. N.,
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PROJECT # 180107-06		DATE January 11, 2019	
DRAWN KH	CHECKED HH/FAR	FIG NO. 8-3	REV 0



LEGEND

- Preliminary Water Quantity Study Area (WQSA)
- Tertiary Watershed Boundary
- Quaternary Watershed Boundary
- Major Water Course and Flow Direction
- Watercourse
- Watershed Boundaries

Elevation Contours

- 10 m
- 50 m

1				
REV	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
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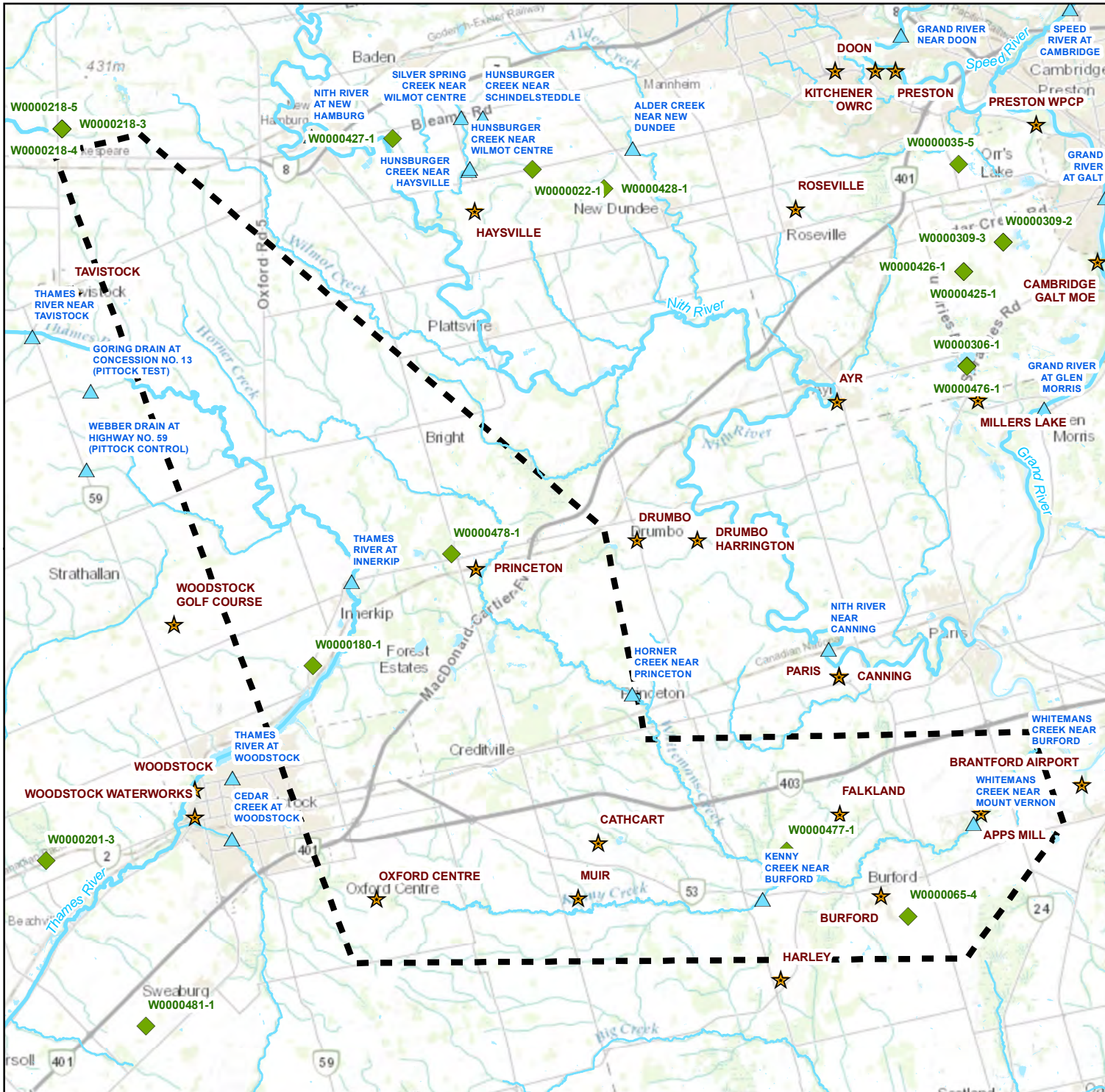
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Whitemans Creek Regional Topography and Hydrology

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LEGEND

- ◆ Provincial Groundwater Monitoring Network
- ▲ HYDAT Stations
- ★ Weather Stations
- Major Watercourse
- Watercourse
- Preliminary Water Quantity Study Area

1				
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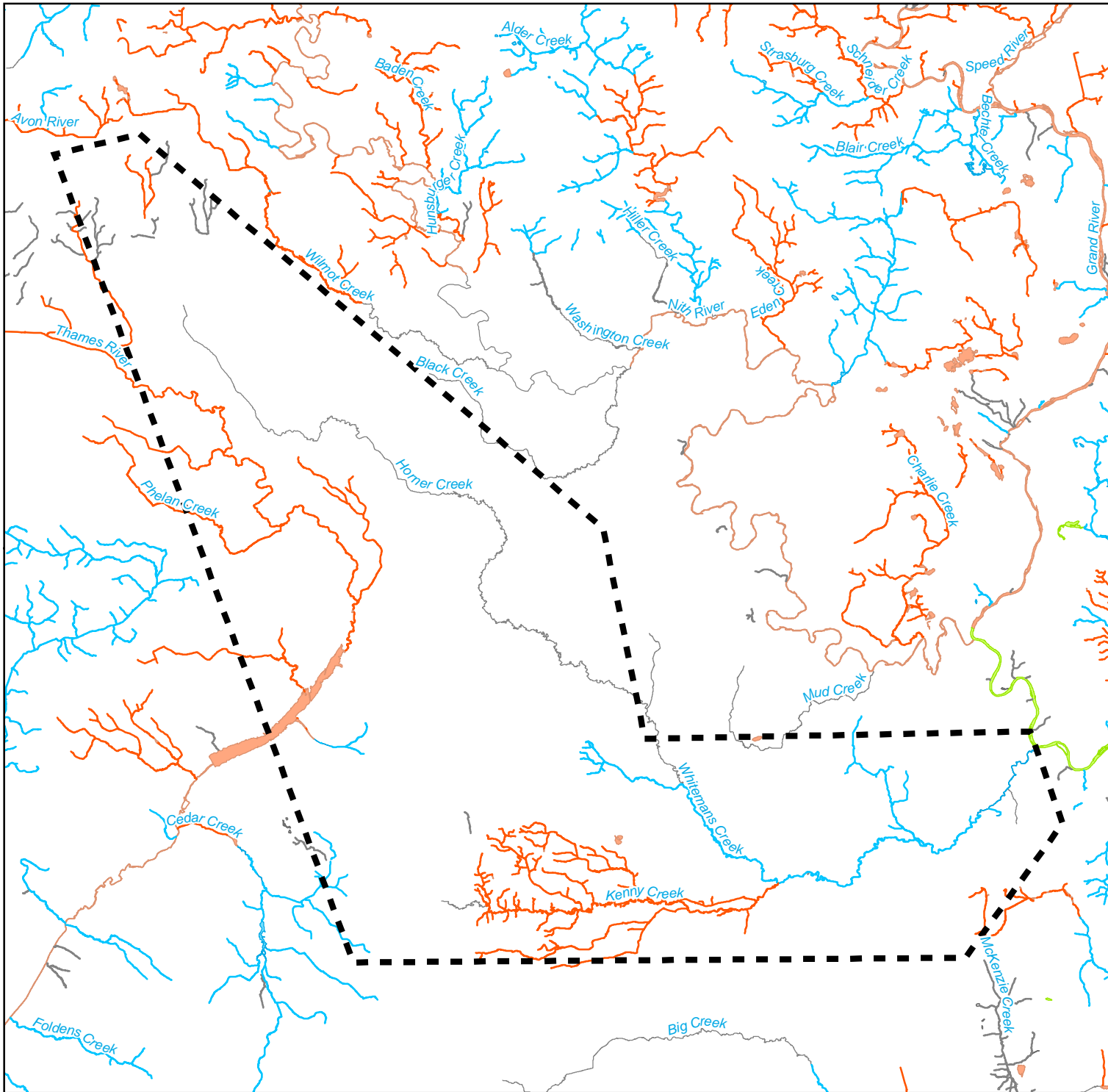
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Whitemans Creek Meteorological Stations

BluMetric
 Environmental
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PROJECT # 180107-06		DATE January 11, 2019	
DRAWN KH	CHECKED RH	FIG NO. 8-5	REV 0



LEGEND

Preliminary Water Quantity Study Area (WQSA)

Thermal Regime

Unknown
 Cold
 Cool
 Warm

Thermal Regime

Unknown
 Cold
 Cool
 Warm

1					
REV	DESCRIPTION	YY/MM/DD	BY	CHK	

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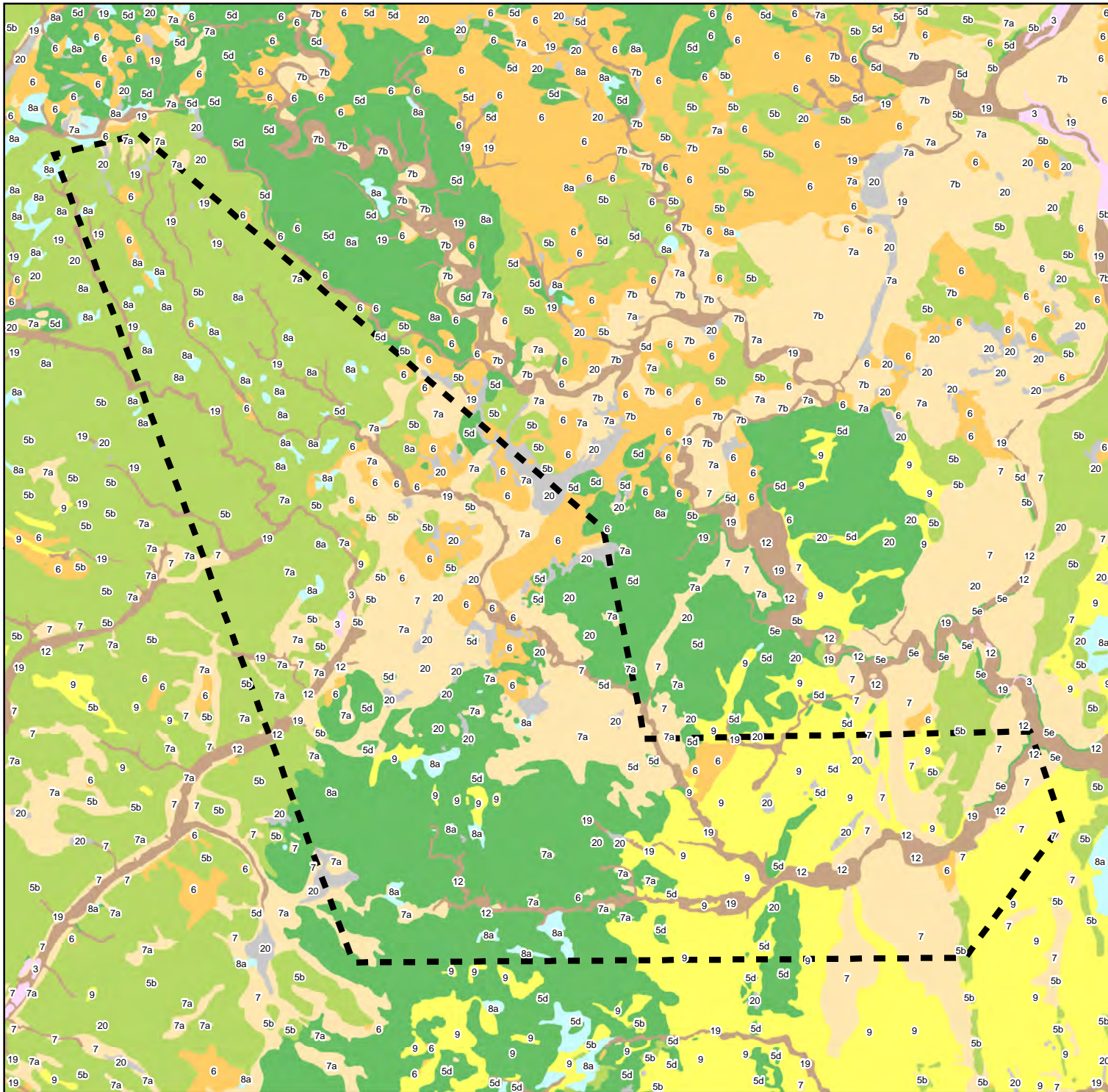
Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE

Whitemans Creek Aquatic Thermal Regions

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PROJECT #		DATE	
180107-06		January 11, 2019	
DRAWN	CHECKED	FIG NO.	REV
KH	HH/FAR	8-6	0



- LEGEND**
- Preliminary Water Quantity Study Area (WQSA)
 - Surficial Geology (MNDM File - MRD128-REV)**
 - 3: Paleozoic bedrock
 - 5b: Stone-poor, carbonate-derived silty to sandy till
 - 5d: Glaciolacustrine-derived silty to clayey till
 - 5e: Undifferentiated older tills, may include stratified deposits
 - 6: Ice-contact stratified deposits
 - 7: Glaciofluvial deposits
 - 7a: Sandy deposits
 - 7b: Gravelly deposits
 - 8a: Massive-well laminated
 - 9: Coarse-textured glaciolacustrine deposits
 - 9b: Littoral-foreshore deposits
 - 12: Older alluvial deposits
 - 19: Modern alluvial deposits
 - 20: Organic deposits

1				
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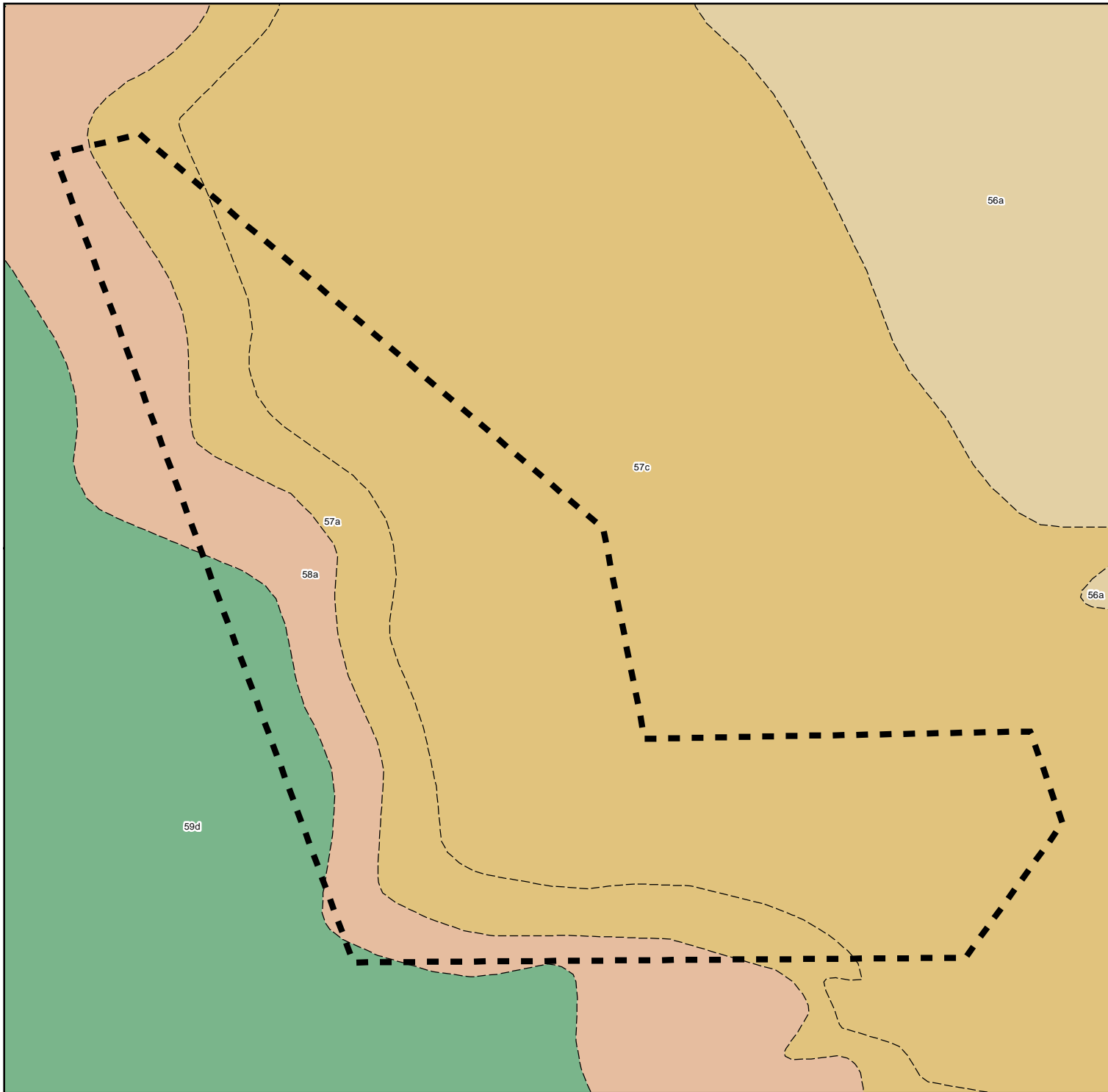
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 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Whitemans Creek Surficial Geology

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PROJECT # 180107-06	DATE January 11, 2019		
DRAWN KH	CHECKED HH/FAR	FIG NO. 8-7	REV 0



LEGEND

- Preliminary Water Quantity Study Area (WQSA)
- Contact, Sharp, Trend, Interpreted
- Lower Silurian - sandstone, shale, dolostone, siltstone**
- 56a - Guelph Formation
- Upper Silurian - limestone, dolostone, shale, sandstone, gypsum, salt**
- 57a - Bass Islands Formation
- 57c - Salina Formation
- Lower Devonian - sandstone, dolostone, limestone**
- 58a - Bois Blanc Formation; Oriskany Formation
- Middle Devonian - limestone, dolostone, shale**
- 59d - Detroit River Group; Onondaga Formation

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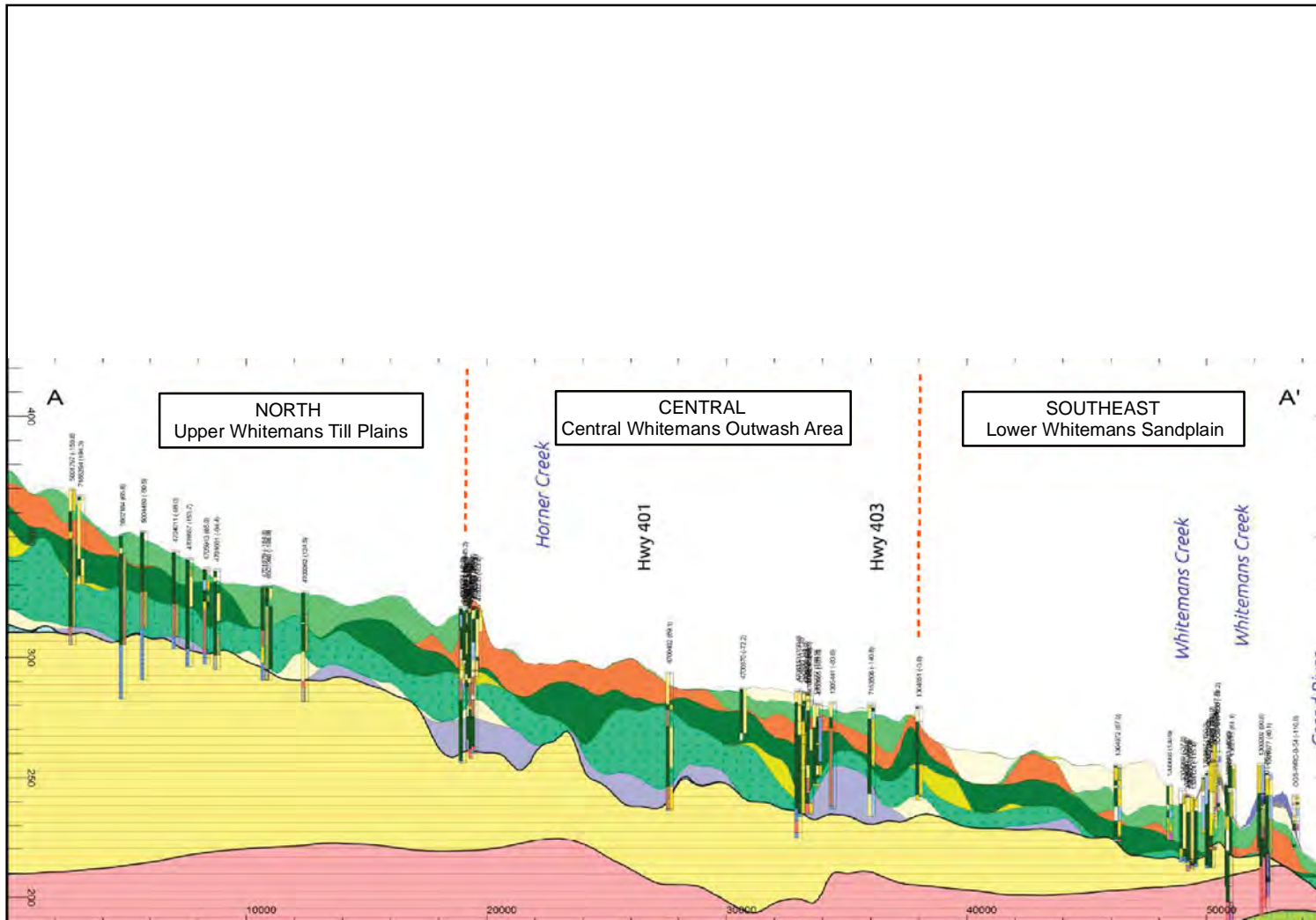
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PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Whitemans Creek Bedrock Geology

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PROJECT # 180107-06		DATE January 11, 2019	
DRAWN KH	CHECKED HH/FAR	FIG NO. 8-8	REV 0



LEGEND

- AFA0 - Whittlesey Sand Aquifer
- ATA1 - Whittlesey Aquitard
- ATA2 - Wentworth Till Aquitard
- AFA2 - Sand Plain and Outwash Aquifer
- ATB1 - Port Stanley/Tavistock Aquitard
- AFB1 - Waterloo Moraine Aquifer
- ATB3 - Maryhill Till Aquitard
- AFB3 - Post-Catfish Aquifer
- ATC1 - Catfish Creek Till Aquitard
- AFD1 - Pre-Catfish Creek Aquifer
- ATE1 - Canning Till Aquitard
- Dundee Formation
- Bois Blanc Formation
- Bass Island Formation
- Upper Salina Group
- Lower Salina Group
- Guelph Formation
- Boreholes QA6

NOTES
 See Figure 8-1 for A-A' path.
 Hydrogeological cross-section sourced from Whitemans Creek Tier Three Local Area Water Budget Risk Assessment, Earthix, March 2018.

1				
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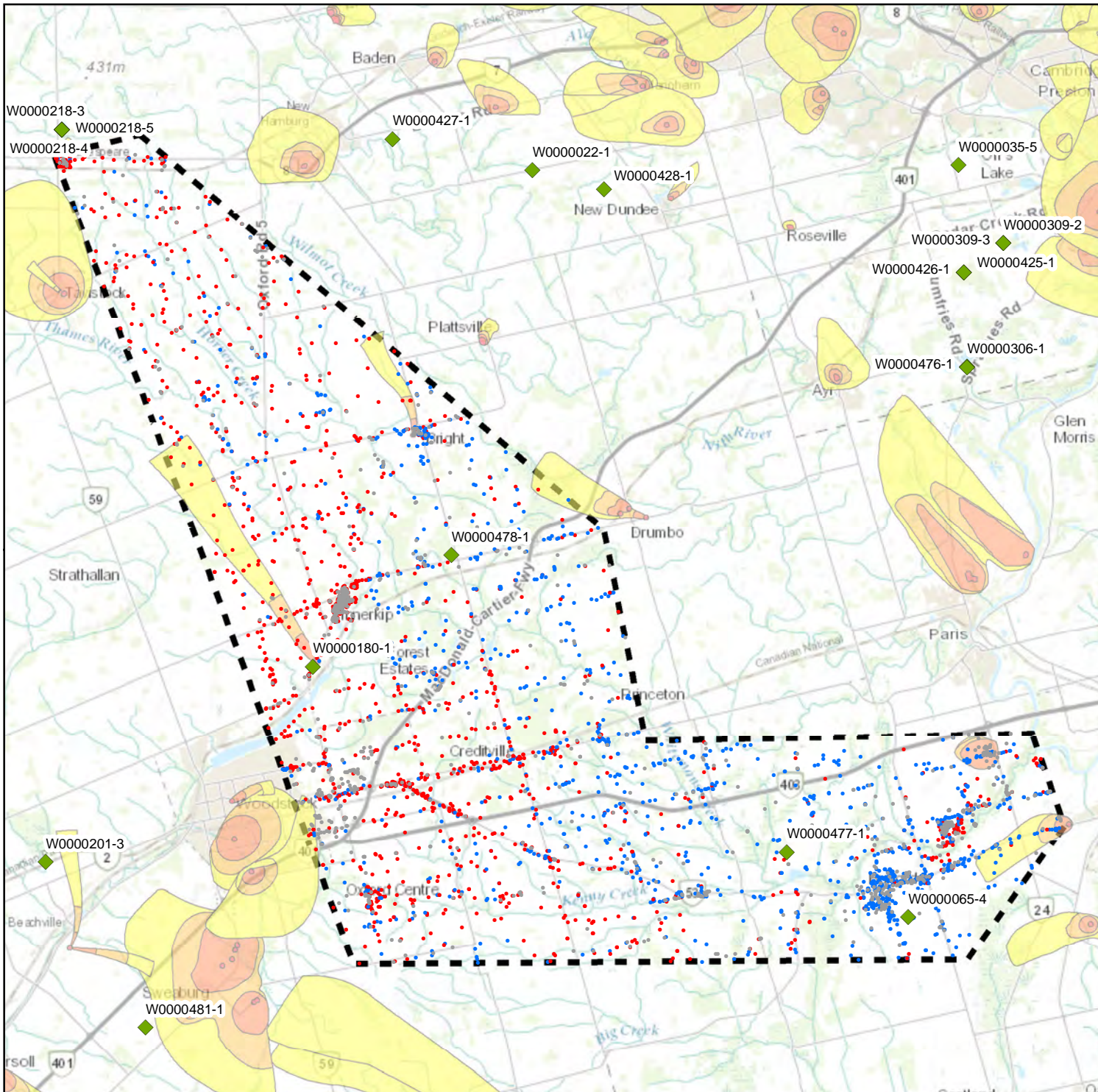
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 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
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TITLE
 Whitemans Creek Hydrogeological Cross-Section

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PROJECT # 180107-06		DATE January 11, 2019	
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LEGEND

- ◆ Provincial Groundwater Monitoring Network Wells
- Bedrock Well
- Overburden Well
- Unknown Well Type

Wellhead Protection Areas

- A
- B
- C
- C1
- D
- F

Preliminary Water Quantity Study Area (WQSA)

1				
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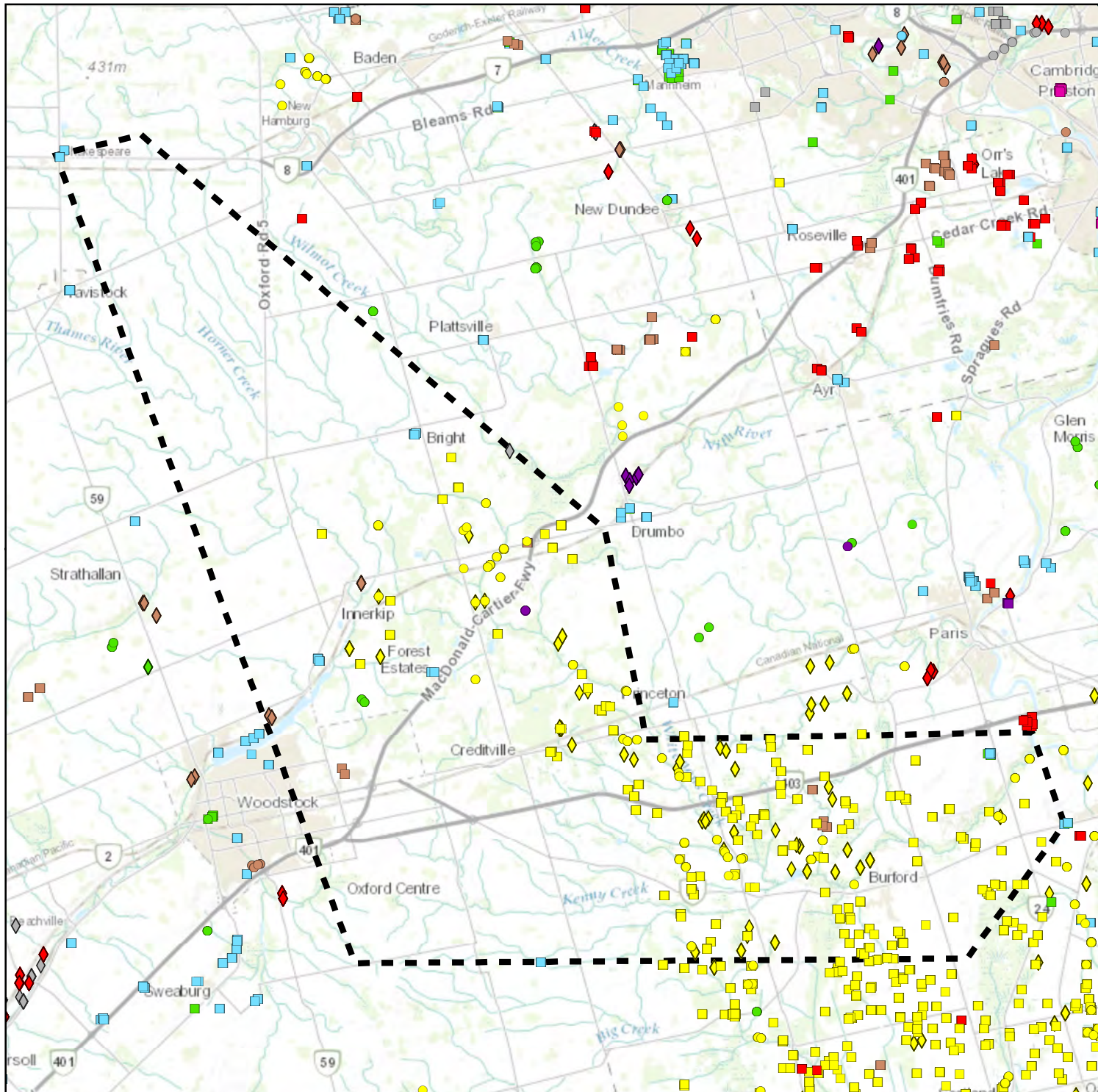
CLIENT
 Ministry of the Environment, Conservation and Parks (MECP)

PROJECT
 Assessment of Water Resources to Support a Review of Ontario's Water Quantity Management Framework

TITLE
 Whitmans Creek Water Well Information System and Provincial Groundwater Monitoring Network Wells

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DRAWN KH	CHECKED HH/FAR	FIG NO. 8-10	REV 0



LEGEND

- Preliminary Water Quantity Study Area (WQSA)
- Water Taking Permit by Type and Purpose**
- Agricultural
- Commercial
- Dewatering
- Industrial
- Institutional
- Miscellaneous
- Recreational
- Remediation
- Water Supply

Surface Water
Groundwater
Both

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PROJECT
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TITLE
 Whitemans Creek Permitted Water Takings

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DRAWN KH	CHECKED HH/PAR	FIG NO. 8-11	REV 0